



Problem of the Week

Problem B and Solution

The Apartments are Multiplying

Problem

Alisa’s apartment building has 12 floors, with 6 apartments on each floor. We have the following information about three other apartment buildings.

- Compared to Alisa’s building, Bettina’s apartment building has the same number of floors, but three times as many apartments on each floor.
- Compared to Bettina’s building, Colin’s apartment building has twice as many floors, but half as many apartments on each floor.
- Compared to Colin’s building, Dara’s apartment building has twice as many floors, and three times as many apartments on each floor.

Use this information to complete the following table. How does the total number of apartments change from one row to the next?

| Building Owner | Number of Floors | Number of Apartments per Floor | Total Number of Apartments |
|----------------|------------------|--------------------------------|----------------------------|
| Alisa | 12 | 6 | |
| Bettina | | | |
| Colin | | | |
| Dara | | | |



EXTENSION: Ferid’s apartment building has 20 apartments in total. Compared to Ferid’s building, Gauri’s apartment building has five times as many floors, but the same number of apartments per floor. How many apartments in total does Gauri’s building have?

Solution

The completed table is shown.

| Building Owner | Number of Floors | Number of Apartments per Floor | Total Number of Apartments |
|----------------|------------------|--------------------------------|----------------------------|
| Alisa | 12 | 6 | 72 |
| Bettina | 12 | 18 | 216 |
| Colin | 24 | 9 | 216 |
| Dara | 48 | 27 | 1296 |

We notice the following about the total number of apartments.

- Bettina’s apartment building has 3 times as many apartments as Alisa’s. This is because the number of floors did not change but the number of



apartments per floor was multiplied by 3, so the total number of apartments was multiplied by 3.

- Colin's apartment building and Bettina's apartment building have the same number of apartments. This is because the number of floors was multiplied by 2, but the number of apartments per floor was divided by 2. Since these are opposite operations, the total number of apartments did not change.
- Dara's apartment building has 6 times as many apartments as Colin's. This is because the number of floors was multiplied by 2, and the number of apartments per floor was multiplied by 3, so the total number of apartments was multiplied by $3 \times 2 = 6$.

EXTENSION SOLUTION:

Since Gauri's apartment building has 5 times as many floors, but the same number of apartments per floor as Ferid's, then the number of apartments in Gauri's building will be equal to 5 times the number of apartments in Ferid's building, which is $20 \times 5 = 100$.